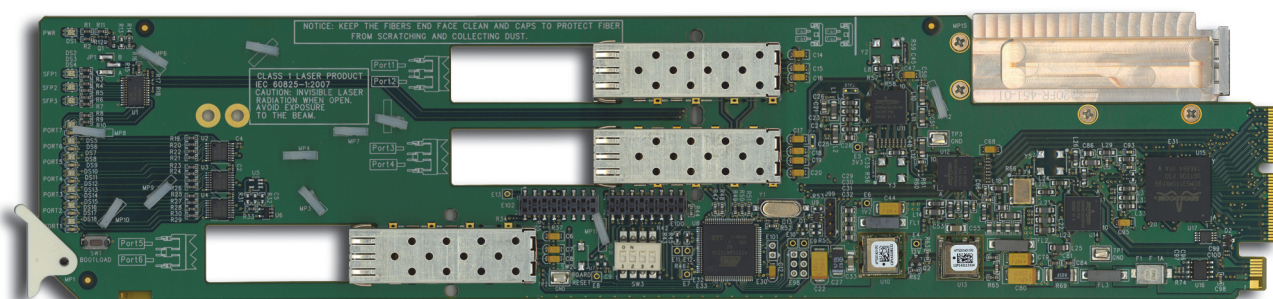


CES-8940

Five Port Ethernet Switch User Manual



Thank you for choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology. Our mission is to:

1. Provide a Superior Customer Experience
 - offer the best product quality and support
2. Make Cool Practical Technology
 - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at solutions@rossvideo.com.



David Ross
CEO, Ross Video
dross@rossvideo.com

Ross Video Code of Ethics

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5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

CES-8940 User Manual

- Ross Part Number: 8940DR-004-02
- Release Date: August 12, 2014.

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Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, refer to the “**Important Safety Instructions**” listed below to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings



This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage to persons or equipment.



Warning — The symbol with the word “**Warning**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



Caution — The symbol with the word “**Caution**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Notice — The symbol with the word “**Notice**” within the equipment manual indicates a potentially hazardous situation, which, if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.



ESD Susceptibility — This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions



Caution — This product is intended to be a component product of the DFR-8300 and OG3-FR series frames. Refer to the DFR-8300 and OG3-FR Series Frame User Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as its component products.



Warning — Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis’ rear appliance connectors before servicing this area.



Warning — Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained with the product’s power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair. To reduce the risk of fire, replacements fuses must be the same time and rating. Only use attachments/accessories specified by the manufacturer.



Warning — *This product includes an “Ethernet Port” which allows this product to be connected to a local area network (LAN). Only connect to networks that remain inside the building. Do not connect to networks that go outside the building.*

EMC Notices

United States of America FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.



Notice — *Changes or modifications to this equipment not expressly approved by Ross Video Limited could void the user’s authority to operate this equipment.*

CANADA

This Class “A” digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe “A” est conforme à la norme NMB-003 du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of CE Directive 93/68/EEC.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002**, and found to comply with the limits for a Class A Digital device.



Notice — *This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.*

Maintenance/User Serviceable Parts

Routine maintenance to this openGear product is not required. This product contains no user serviceable parts. If the module does not appear to be working properly, please contact Technical Support using the numbers listed under the “Contact Us” section on the last page of this manual. All openGear products are covered by a generous 5-year warranty and will be repaired without charge for materials or labor within this period. See the “Warranty and Repair Policy” section in this manual for details.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed out wheelie bin symbol invites you to use these systems.



If you need more information on the collection, re-use, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performance of our products.

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Introduction

In This Chapter

This chapter contains the following sections:

- Overview
- Functional Block Diagram
- User Interfaces
- Documentation Terms and Conventions

A Word of Thanks

Congratulations on choosing an openGear CES-8940 Five Port Ethernet Switch. The CES-8940 is part of a full line of products within the openGear Terminal Equipment family of products, backed by Ross Video's experience in engineering and design expertise since 1974.

You will be pleased at how easily your new CES-8940 fits into your overall working environment. Equally pleasing is the product quality, reliability and functionality. Thank you for joining the group of worldwide satisfied Ross Video customers!

Should you have a question pertaining to the installation or operation of your CES-8940, please contact us at the numbers listed on the back cover of this manual. Our technical support staff is always available for consultation, training, or service.

Overview

The CES-8940 includes up to four RJ45 ports plus one GigE (SERDES) port connected to the OG3-FR series frame midplane that communicates with the switch on the Network Controller Card. These ports can be configured as a generic switch (any port to any port). They can also be set up for 1:1 trunking between any ports or redundant/load sharing trunking such as four wired links with auto fail-over. Port based VLAN is also supported as you can choose to partition the switching ports into virtual private domains assigned on a per port basis.

The switching function operates transparently for DHCP, ARP, Multicast and Broadcast, and VLAN services (except where restricted by configuration). Note that the CES-8940 does not provide Power Over Ethernet (POE) but will work with switches that follow 802.3eaf/at.

The CES-8940 is fully hot-swappable with all active components on the front removable module. No active components are installed on the rear module. This design greatly reduces down time eliminating any need for users to access the back of the openGear frame.

Features

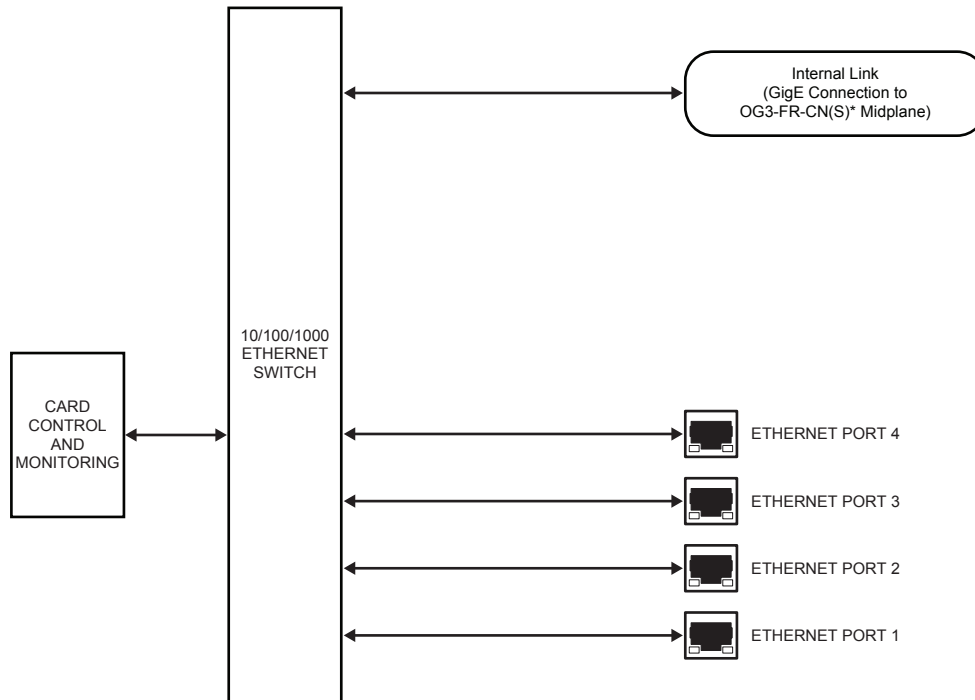
The following features are standard for the CES-8940:

- Compliant with IEEE 802.3 (10/100/1000BASE-T)
- Supports 10/100/1000¹ Base T Ethernet on four RJ45 connectors
- Auto negotiation for 10/100/1000¹ speeds, half/full duplex modes, MDI/MDIX auto-crossover
- Supports two trunk groups between two devices with each trunk group having up to four ports
- Supports port-based VLAN by allowing the partition of switching ports into virtual private domains based on individual ports
- Allows for port disabling
- Up to five available ports using a combination of ethernet (via RJ45 connections), and a GigE internal link to the Network Controller Card in the OG3-FR series frames
- LC/UPC optical blind-mate connections
- Card-edge LED indicator for power status
- Rear module is fully passive using a blind mate LC connection
- Hot-swappable from front of frame with no external connect/reconnect required
- Reports status and configuration remotely via DashBoard
- Compatible with the DFR-8321 series and OG3-FR series frames
- Fully compliant with openGear specifications
- 5-year transferable warranty

1. GigE SERDES support only available when the card is installed in the OG3-FR series frames with an MFC-8322-N.

Functional Block Diagram

This section provides a functional block diagram that outlines the workflow of the CES-8940.



*Internal GigE connection requires the MFC-8322-N(S) network controller card for the OG3-FR frame.

Figure 1.1 CES-8940 — Simplified Block Diagram

User Interfaces

The CES-8940 provides the following user interfaces.

DashBoard Control System

DashBoard enables you to monitor and control openGear frames and cards from a computer. DashBoard communicates with other cards in the openGear frame through the Network Controller Card.

For More Information on...

- installing and using DashBoard, refer to the ***DashBoard User Manual***.
- using the Network Controller Card, refer to its user manual.
- the menus available in DashBoard for the CES-8940, refer to the chapter “**DashBoard Menus**” on page 4-1.

Card-edge Controls

The front-edge of the CES-8940 includes an LED indicator for power status. LEDs on the rear module indicates communication and traffic activity.

For More Information on...

- the card-edge LEDs, refer to the section “**Card-edge LEDs**” on page 3-3.
- the rear module LEDs, refer to the section “**Rear Module LEDs**” on page 3-4.

SNMP Monitoring and Control

The Network Controller Card in the openGear frame provides optional support for remote monitoring of your frame and using the Simple Network Management Protocol (SNMP), which is compatible with many third-party monitoring and control tools.

For More Information on...

- the available SNMP controls for the CES-8940, refer to the Management Information Base (MIB) file for your card.
- SNMP monitoring and control, refer to the user manual for your Network Controller Card.

Documentation Terms and Conventions

The following terms and conventions are used in this manual.

Terms

The following terms are used:

- “**Board**”, and “**Card**” refer to openGear terminal devices within openGear frames, including all components and switches.
- “**DashBoard**” refers to the DashBoard Control System.
- “**DFR-8321 series frame**” refers to all versions of the DFR-8321 series frames and available options unless otherwise noted.
- “**Frame**” refers to openGear frame that houses the CES-8940.
- “**Network Controller Card**” refers to the MFC-8320-N and MFC-8322-N unless otherwise noted.
- “**OG3-FR series**” refers to all versions of the OG3-FR frames and any available options unless otherwise noted.
- “**openGear frame**” refers to the DFR-8321 series and the OG3-FR series frames that house openGear cards.
- “**Operator**” and “**User**” refer to the person who uses the CES-8940.
- “**SFP**” refers to small form-factor pluggable fiber transceiver.
- “**System**” and “**Video system**” refer to the mix of interconnected production and terminal equipment in your environment.
- “**Trunking**” refers to using two or more ethernet links between points to increase bandwidth or provide redundancy.
- “**VLAN**” refers to Virtual Local Area Network.

Conventions

The following conventions are used:

- The “**Operating Tips**” and “**Note**” boxes are used throughout this manual to provide additional user information.

Installation

In This Chapter

This chapter provides instructions for installing the Rear Module(s) for the CES-8940, installing the card into the frame, cabling details, and updating the software.

The following topics are discussed:

- Before You Begin
- Installing the CES-8940
- Cabling for the CES-8940
- Ethernet Communications Overview
- Software Upgrades

Before You Begin

Before proceeding with the instructions in this chapter, ensure that your openGear frame is properly installed according to the instructions in its manual.



Important — *Contact your IT Department before connecting to your facility network to ensure that there are no conflicts or the possibility of creating a network loop.*

Static Discharge

Throughout this chapter, please heed the following cautionary note:



ESD Susceptibility — *Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas and when synthetic fiber clothing is worn. Always exercise proper grounding precautions when working on circuit boards and related equipment.*

Unpacking

Unpack each CES-8940 you received from the shipping container and ensure that all items are included. If any items are missing or damaged, contact your sales representative or Ross Video directly.

Installing the CES-8940

This section outlines how to install the rear module and the CES-8940 in an openGear frame. You must install the CES-8940 in an OG3-FR series frame to take advantage of the GigE interface.

Supported Rear Modules



Notice — *Ensure that you install the CES-8940 using the supported rear module listed below. Installing the CES-8940 with an unsupported rear module can damage the card, the rear module, or both.*

The **8320AR-056** Full Rear Module is required.

Installing a Rear Module

If the Rear Module is already installed, proceed to the section “**To install the card in an openGear frame**” on page 2-4.

To install a rear module in your openGear frame

1. Locate the card frame slots on the rear of the frame.
2. To apply a label to your rear module:
 - Verify whether your **Rear Module Label** is self-adhesive by checking the back of the label for a thin wax sheet. You will need to remove this wax sheet before applying the label in order that the label can be affixed to the rear module surface.
 - Affix the supplied **Rear Module Label** to the BNC area of the Rear Module.
3. Remove the Blank Plate from the slot you have chosen for the installation. If there is no Blank Plate installed, proceed to the next step.
4. Seat the bottom of the Rear Module in the **Module Seating Slot** at the base of the frame’s back plane. (**Figure 2.1**)

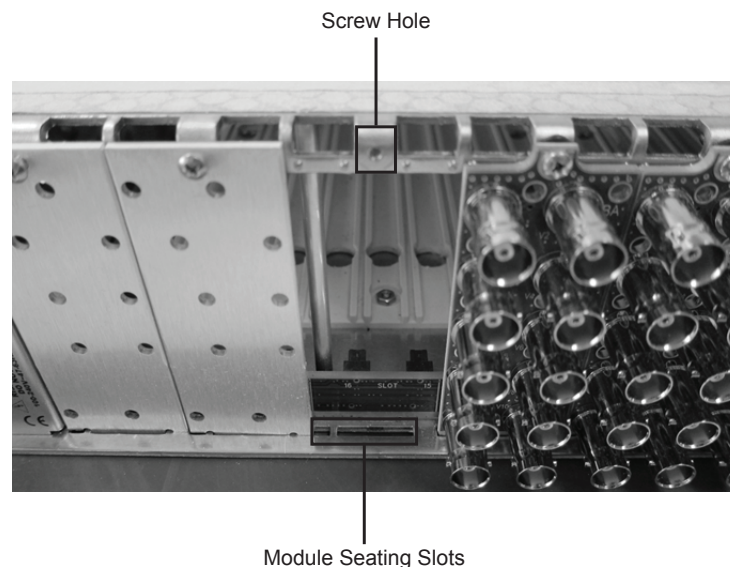


Figure 2.1 Rear Module Installation in an OG3-FR Series Frame (Card not shown)

5. Align the top hole of the Rear Module with the screw on the top-edge of the frame back plane.
6. Using a Phillips screwdriver and the supplied screw, fasten the Rear Module to the back plane of the frame. Do not over tighten.
7. Ensure proper frame cooling and ventilation by having all rear frame slots covered with Rear Modules or Blank Plates.

To install the card in an openGear frame

1. Locate the Rear Module you installed in the procedure “**Installing a Rear Module**”.
2. Ensure that the Rear Module is one of the required rear modules for the CES-8940.
3. Hold the card by the edges and carefully align the card-edges with the slots in the frame.
4. Fully insert the card into the frame until the rear connection plug is properly seated in the Rear Module.
5. Cable your rear module as outlined in the section “**Cabling for the CES-8940**” on page 2-5.

Cabling for the CES-8940

This section provides information for connecting cables to the installed Rear Module on the openGear frames. Connect the input and output cables according to the following sections.

Cabling Overview

In the openGear frames, the CES-8940 is used with the **8320AR-056** Full Rear Module. Each rear module occupies two slots and accommodates one card. This rear module provides four RJ45 Ethernet 10/100/1000 ports. (**Figure 2.2**)

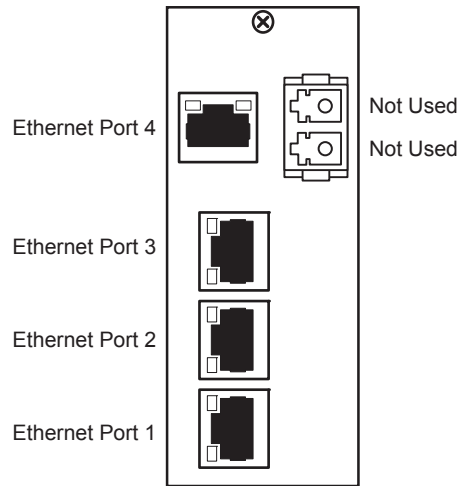


Figure 2.2 Cable Connections for the CES-8940

Ethernet Communications Overview

The four RJ45 ports on the **8320AR-056** rear module support 10/100/1000 Base T Ethernet communications.

In addition to the **Ethernet** ports on the rear module, you must also provide an ethernet connection to the openGear frame as outlined in its manual.



Important — Contact your IT Department before connecting to your facility network to ensure that there are no conflicts or the possibility of creating a network loop.

For More Information on...

- setting up ethernet communications for your openGear frame, refer to the *MFC-8300 Series User Manual*.

Ethernet Cabling Overview

The exact steps for connecting to your facility via an ethernet network depends on the network requirements of your facility.

You will require up to four standard network CAT-5e cables to connect the card to your facility network. (**Figure 2.3**) There is no need for a crossover cable as the rear modules include an Auto-MDIX ethernet PHY that will switch from straight to crossover automatically as needed. Ross Video does not supply these cables.

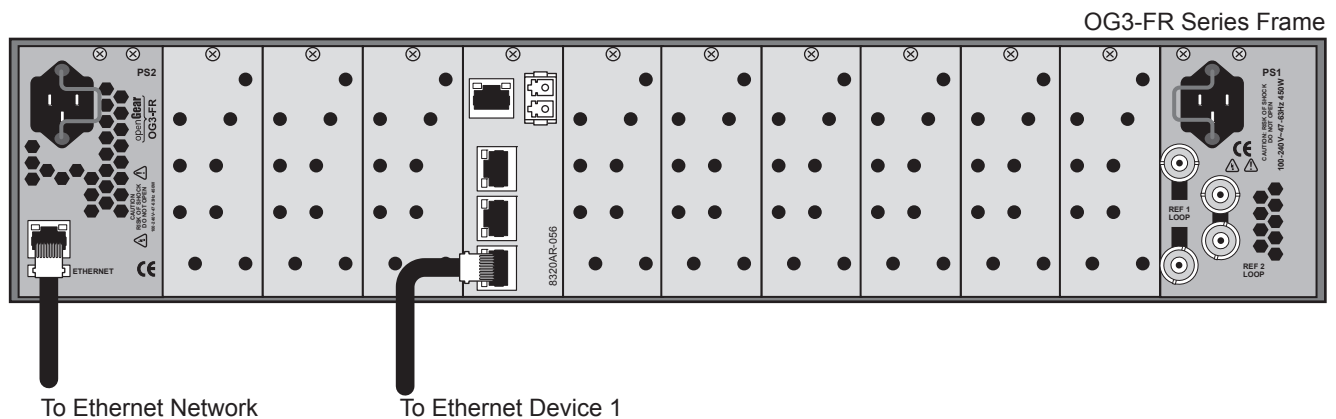


Figure 2.3 Cabling to Ethernet Port 1 on the 8320AR-056 Rear Module

Internal GigE Link

Port 7 out of the CES-8940 provides a GigE SERDES interface to the OG3-FR midplane to provide a link to the Ethernet switch on the Network Controller Card. This interface is identified as **Internal Link** in the Dashboard menus.

Software Upgrades

This section provides instructions for upgrading the software for your CES-8940 using DashBoard.

To upgrade the software on your card

1. Contact Ross Technical Support for the latest software version file.
2. In DashBoard, display the **Device** tab of the CES-8940 by double-clicking its status indicator in the **Basic Tree View**.
3. From the **Device** tab, click **Upload** to display the **Select File for upload** dialog box.
4. Navigate to the *.bin upload file you wish to upload.
5. Click **Open**.
6. If you are upgrading a single card:
 - Click **Finish** to display the **Uploading to Selected Devices** dialog.
 - Proceed to step 8.
7. If you are upgrading multiple cards:
 - Click **Next >** to display the **Select Destination** menu. This menu provides a list of the compatible cards based on the card selected in step 2.
 - Specify the card(s) to upload the file to by selecting the check box(es) for the cards you wish to upload the file to.
 - Verify the card(s) you wish to upload the file to. The **Error/Warning** fields indicate any errors, such as incompatible software or card type mismatch.
 - Click **Finish** to display the **Uploading to Selected Devices** dialog.
8. Monitor the upgrade.
 - The **Uploading to Selected Devices** dialog enables you to monitor the upgrade process.
 - Click **OK** to complete the upgrade process.
 - The card(s) are temporarily taken offline during the re-boot process. The process is complete once the status indicators for the **Card State** and **Connection** fields return to their previous status.

Troubleshooting

If you encounter problems when upgrading your card software, verify that the file you are attempting to load is a *.bin file that is for the card you are upgrading and that you have a valid network connection.

Configuration

In This Chapter

This chapter provides a general overview of the user controls and configuration options available for your CES-8940.

The following topics are discussed:

- Card Overview
- Control and Monitoring Features
- Configuring a VLAN
- Enabling Trunking
- Enabling Alarms

Card Overview

This section provides a general overview of the CES-8940 components. For information on the LEDs available on the card-edge, refer to the section “**Control and Monitoring Features**” on page 3-3.

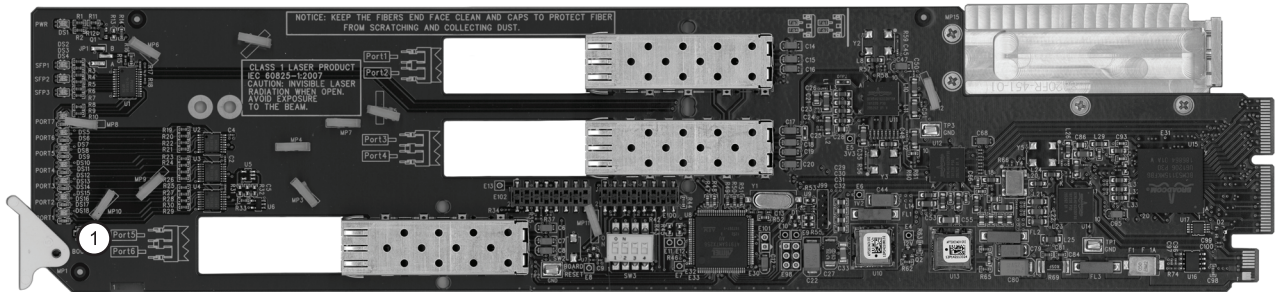


Figure 3.1 CES-8940 — Components

1. Bootload Button (SW3)

SW3 is used for factory service in the unlikely event of a complete card failure. The Bootload process is further described in the section “**Bootload Button**” on page 6-2.

Control and Monitoring Features

This section provides information on the power status LED located on the card-edge and the LEDs on all rear modules for the CES-8940.

Card-edge LEDs

The front-edge of the CES-8940 has LED indicators for alarms, and communication activity. Refer to **Figure 3.2** for the location of the LEDs.

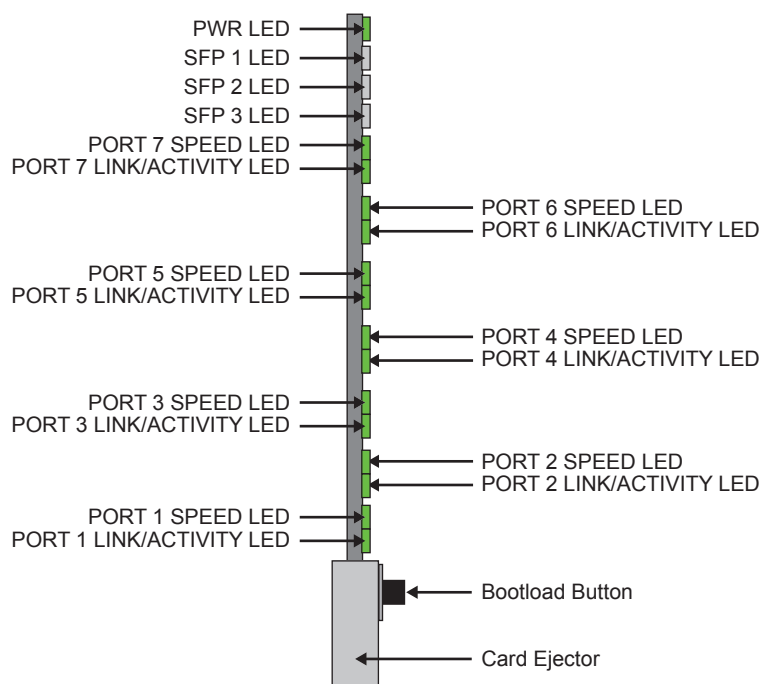


Figure 3.2 CES-8940 — Card-edge PWR LED

Each pair of PORT LEDs on the card-edge report on a specific RJ45 port for your card. **Table 3.1** outlines the mapping of the LEDs.

Table 3.1 Port LED Mapping

| LED | Reports Status of |
|--------|-------------------|
| PORT 7 | Internal Link |
| PORT 6 | Not implemented |
| PORT 5 | Not implemented |
| PORT 4 | RJ45 #4 |
| PORT 3 | RJ45 #3 |
| PORT 2 | RJ45 #2 |
| PORT 1 | RJ45 #1 |

Card-edge LEDs Overview

Basic LED displays and descriptions are provided in **Table 3.2**.

Table 3.2 Card-edge LEDs

| LED | Color | Display and Description |
|----------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| PWR | Green | When lit green, this LED indicates that the card is functioning normal and that no anomalies have been detected. |
| | Flashing Green | When flashing green, this LED indicates that the bootloader is currently running. |
| | Yellow | When lit yellow, this LED indicates that the CPU is booting. |
| | Red | When lit red, this LED indicates that the card is powering on or there is a fault condition. |
| | Off | When unlit, this LED indicates a lack of power to the card. |
| SFP # | These LEDs are not implemented. | |
| PORT # SPEED^a | Green | When lit green, this LED indicates the port speed is at 1Gbps. |
| | Orange | When lit orange, this LED indicates the port speed is at 100Mbps. |
| | Off | When unlit, this LED indicates the port speed is at 10Mbps. |
| PORT # LINK/ ACTIVITY^a | Green | When lit green, this LED indicates a valid link is established on the port. |
| | Flashing Green | When flashing green, this LED indicates communication activity is occurring. |
| | Off | When unlit, this LED indicates an invalid link is detected. Verify the cable connection on the rear module port and your network connections. |

a. Note that Ports 5 and 6 are not implemented.

Rear Module LEDs

Each RJ45 connector on the **8320AR-056** rear module include two LEDs that report the ethernet communication activity and speed for the card. Refer to **Figure 3.3** for LED locations.

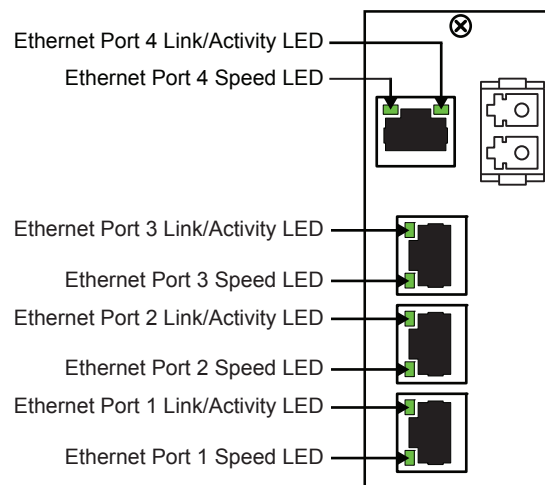


Figure 3.3 8320AR-056 Rear Module LEDs

Rear Module LEDs Overview

Basic LED descriptions are provided in **Table 3.3**.

Table 3.3 LEDs on the Rear Modules

| LED | Color | Display and Description |
|----------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ETHERNET PORT # LINK/ACTIVITY | Green | When lit green, this LED indicates a valid link is established on the specified RJ45 port. |
| | Flashing Green | When flashing green, this LED indicates communication activity is occurring on the specified RJ45 port. |
| | Off | When unlit, this LED indicates an invalid link is detected on the specified RJ45 port. Verify the cable connection on the rear module port and your network connections. |
| ETHERNET PORT # SPEED | Green | When lit green, this LED indicates the on the specified RJ45 port speed is at 1Gbps. |
| | Orange | When lit orange, this LED indicates the on the specified RJ45 port speed is at 100Mbps. |
| | Off | When unlit, this LED indicates the on the specified RJ45 port speed is at 10Mbps. |

Configuring a VLAN

A virtual local area network (VLAN) is a logical grouping of workstations, servers, and network devices that appear to be on the same LAN whether they are part of a larger local LAN or geographically dispersed. A VLAN allows a network of computers and users to communicate in a simulated environment as if they exist in a single LAN and are sharing a single broadcast and multicast domain.

You can create port-based VLANs that act like a straight communication and isolating the traffic from each other. In setups as seen in **Figure 3.4** and **Figure 3.5** the Corporate Network(s) need to recognize port-based VLANs. The Corporate Networks in **Figure 3.4** require the ends at Corporate Network 1 and Corporate Network 2 to be setup as either trunks or port-based VLANs to prevent loops at either end. **Figure 3.5** shows a simple connection where each VLAN terminates in a single device (or isolated subnet). Unlike **Figure 3.4**, there is no requirement for additional setup of the Corporate Network as the 5 Port Ethernet Switch card appears as a transparent cable extender.

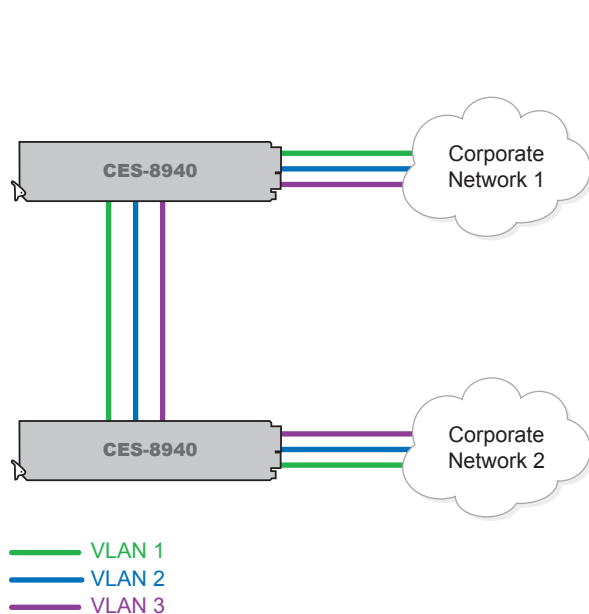


Figure 3.4 Multiple Cards Setup with Three VLANs

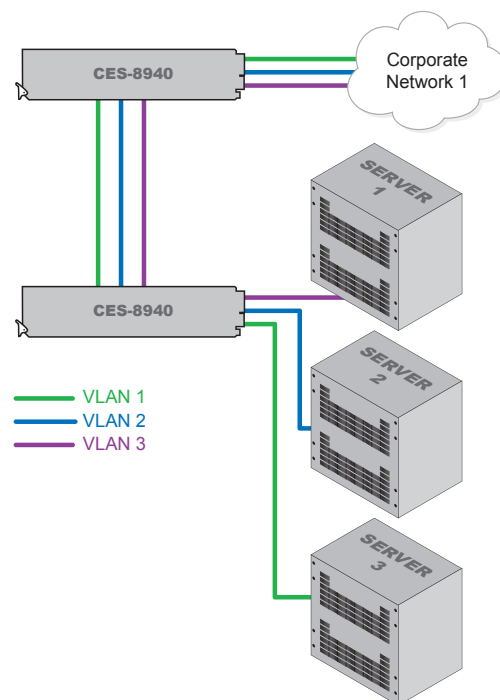


Figure 3.5 Multiple Cards with Separate End Points

Configuring the VLAN Feature

The CES-8940 supports port-based VLANs. The switching ports are partitioned into virtual private domains assigned on a per port basis. This provides a simple partitioning of the switch so that different user groups can share the switch yet be isolated from each other.



Note — By default, all ports are automatically assigned to VLAN 1, allowing each card to operate as a generic ethernet switch (any port to any port). There must always be at least one VLAN enabled for the card to function as an ethernet switch.

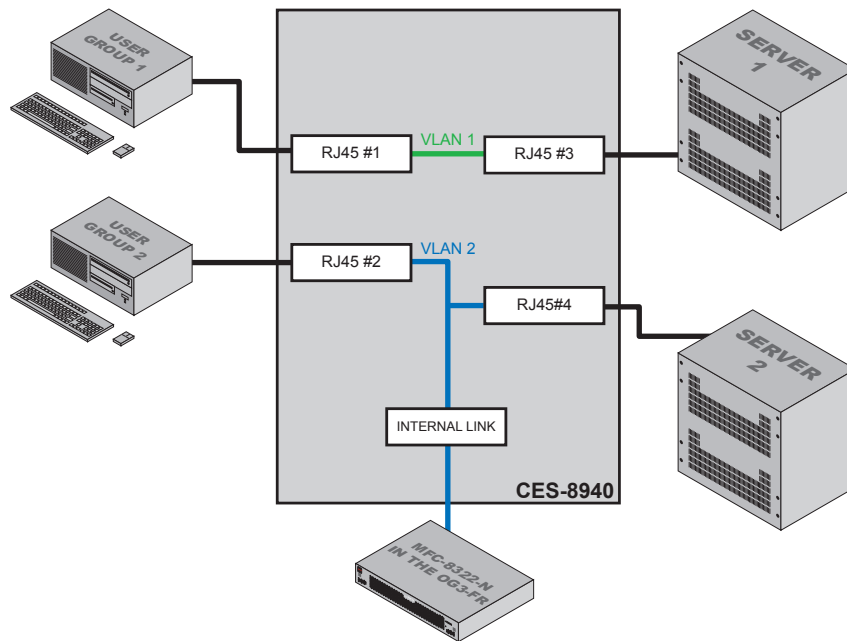
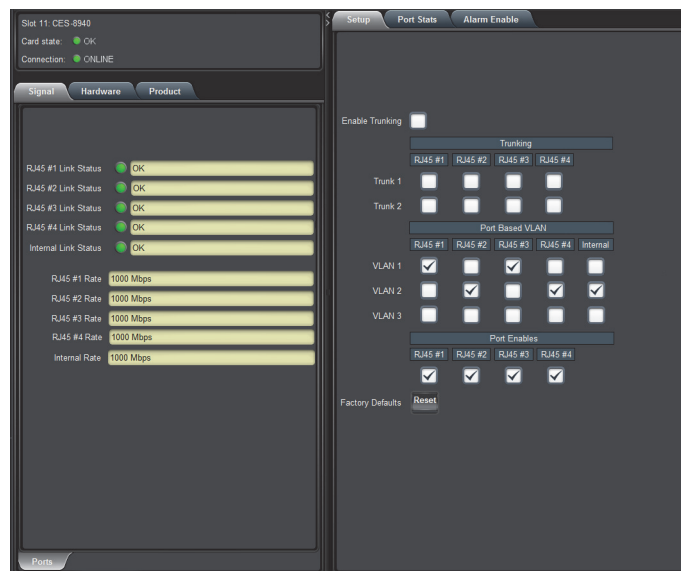


Figure 3.6 Example of Multiple VLAN Setup using a Single CES-8940

To enable a VLAN setup

1. From the **Device View**, select the **Setup** tab.



Configuring a VLAN Group

2. In the **Port Enables** area, select the required check boxes to activate the specified RJ45 and Internal ports on your card.
3. To assign ports on the card to a VLAN:
 - Locate the **VLAN** area of the **Setup** tab.
 - Select the applicable **VLAN #** check box for each port you wish to include.



Note — A minimum of two ports must be assigned to a VLAN in order to establish communications. Assigning only one port to a VLAN isolates that port.

4. For each VLAN you wish to add ports to, repeat step 3.

Enabling Trunking

Trunking, also known as link aggregation, is the use of two or more links between nodes (switches and/or servers) in parallel to increase the bandwidth. A side benefit is that a failure of a link will cause the traffic to be redistributed among the remaining links, though at reduced overall capacity.

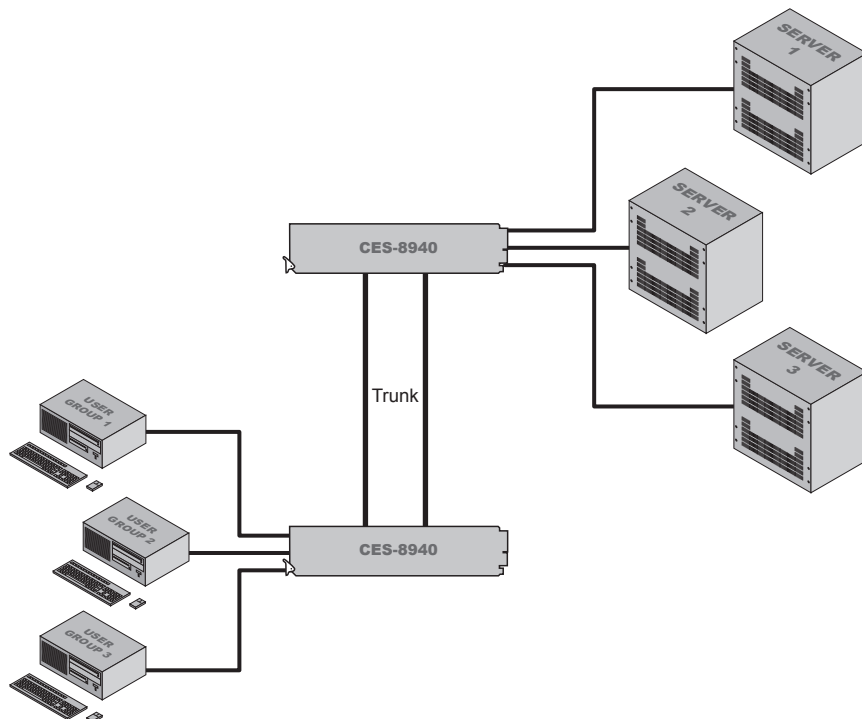


Figure 3.7 Multiple Cards set to Trunk for Increased Bandwidth Between End Points

A Word About Loops



Important — Each CES-8940 defaults as a basic switch where all ports are enabled and assigned to VLAN 1. If the card is wired for VLAN and/or trunking, but is not configured as such, you may create a possible network loop which will impact your network.

If you have two or more CES-8940 cards (**Figure 3.8**) or an MFC-8322-N with one or more CES-8940 cards (**Figure 3.9**), there is potential to create multiple paths between devices, causing loops that can bring down a network. If one or more CES-8940 cards are going to connect to the same network, ensure that the internal GigE ports to those cards are turned off by the Network Controller Card. This Internal Loop issue cannot occur with an MFC-8322-S or DFR-8321 series frames.

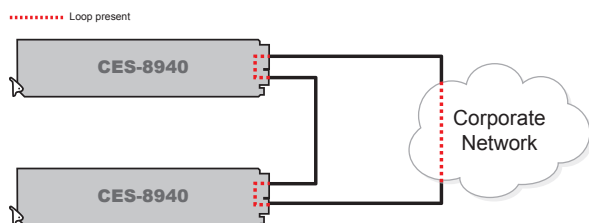


Figure 3.8 Example of a Trunking Group with a Loop

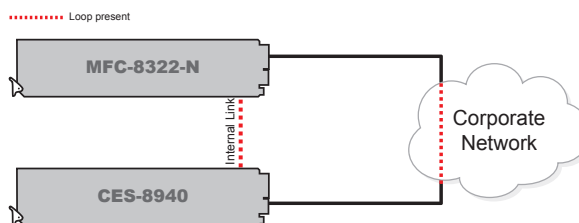


Figure 3.9 Example of a Trunking Group with a Loop

Troubleshooting a Loop

When a loop is created, the CES-8940 may automatically detect the loop and disable the appropriate ports. When this occurs, the LEDs on the rear module and the card-edge flash in unison for the affected ports. Note that the network may be able to avoid the loop if it has spanning tree capability.

Use one of the following methods to troubleshoot:

- Disable the ports in DashBoard and enable them one at a time to see which port is causing the loop.
- Disconnect the cables from the ports on the rear modules and then re-connect the cables one at a time.
- Disconnect the cables from the ports, re-configure the card, and then re-connect the cables one at a time. Use this method when DashBoard cannot connect to the card.

Exceptions

There are exceptions for permitting a looping system: multiple paths are created for redundancy or for high bandwidth traffic. You can have two or more ports acting as a trunk group to increase the bandwidth between two points. The trunk appears as one port in the generic switch mode of operation. It also provides redundancy in that failure of one of the physical ports in the trunk group forces all the traffic to the remaining link(s). **Figure 3.7** illustrates a setup with multiple cards that are set for trunking at full bandwidth between the two cards.

Configuring a Trunking Group

The ports on each CES-8940 can be set up for 1:1 trunking between any ports or for redundant/load sharing trunking. Each card supports two trunk groups between two devices with each trunk group having up to four ports.

In a configuration such as in **Figure 3.10**, you have multiple bandwidths and redundancy between the multiple Corporate Networks with fiber connections. Note that each Corporate Network must be configured to recognize these links are part of a trunk.

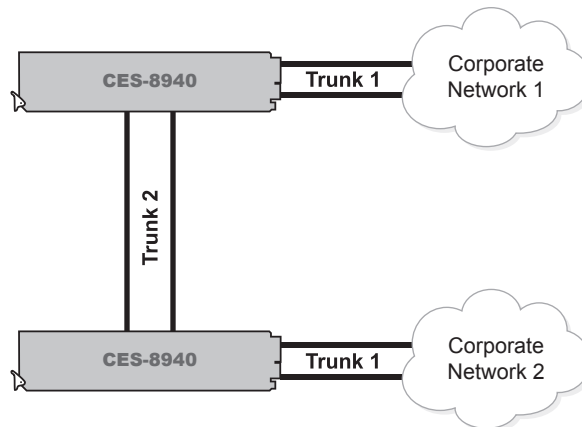
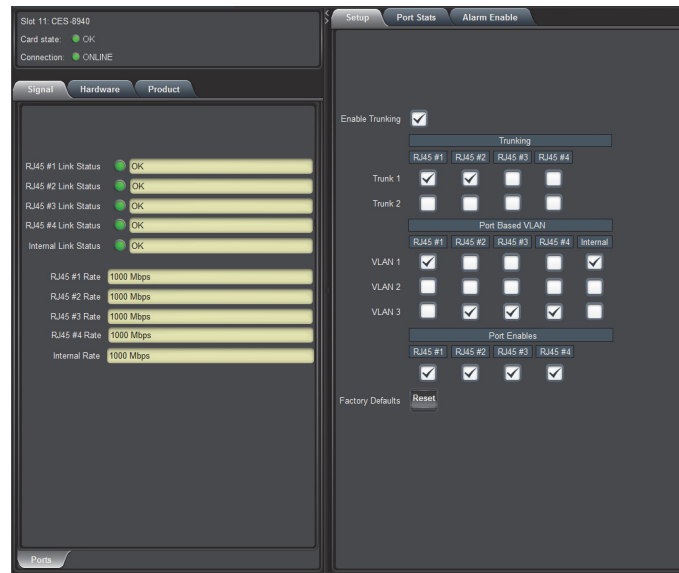


Figure 3.10 Setup of Multiple Bandwidths with Redundancy

To configure a Trunk Group

1. From the **Device View**, select the **Setup** tab.



Configuring a Trunk Group

2. Select the **Enable Trunking** check box.
3. In the **Port Enables** area, select the required check boxes to activate the specified RJ45 ports on your card.
4. To configure a Trunk Group:
 - Locate the **Trunking** area of the **Setup** tab.
 - Select the applicable **Trunk #** check box for each port you wish to include in that Trunk Group. The box displays a check-mark.
5. For each Trunk Group, repeat step 4.

Enabling Alarms

You can configure the CES-8940 to report when one or more of the following error conditions occur:

- A link fails on the card switch
- An incompatible rear module is installed with the card

Error conditions are reported in the applicable fields of the Status tabs for each card in DashBoard. If you do not enable the card to report the alarm condition, the affected status field may report a green indicator (if applicable) with the message “Suppressed Alarm” even when a related alarm condition is occurring on the card.

For More Information on...

- the possible messages in the Status tab, refer to the section “**Status Tabs**” on page 4-2.

Link Failure Alarms

You can choose which RJ45 and/or Internal links the card monitors for link failures. Once an alarm is enabled, the applicable **Link Status** fields in the **Signal** tab will report when the card detects an invalid or absent connection for that link. To verify which connection to troubleshoot, refer to the rear module label.

To enable an alarm to report a link failure

1. From the **Device View**, select the **Alarm Enable** tab.
2. Select the required **RJ45 Link Fails** check box(es) to enable the card to report when the specified RJ45 connector on the rear module loses network connection.
3. Select the **Internal Link Fails** check box to enable the card to report when the GigE connection to the OG3-FR midplane loses network connection.

Incompatible Rear Module Monitoring

You can choose to enable the card to report when an unsupported rear module is installed with your card. This alarm is reported in the **HW Status** field in the **Hardware** tab.

To enable rear module monitoring

1. From the **Device View**, select the **Alarm Enable** tab.
2. Select the **Incompatible Rear Module** check box.

DashBoard Menus

In This Chapter

This chapter briefly summarizes the menus, items, and parameters available from DashBoard for the CES-8940. Note that default values are indicated with an asterisk (*).



Note — *The CES-8940 does not support DataSafe.*

The following topics are discussed:

- Status Tabs
- Port Stats Tab
- Setup Tab
- Alarm Enable Tab

Status Tabs

This section summarizes the read-only information displayed in the **Status** tabs. The fields in the **Status** tabs can vary in severity from green (valid), yellow (caution), to red (alarm). DashBoard reports the most severe alarm for a single field. Alarm colors are noted within the tables as text set in brackets next to the menu parameter name.

Signal Tab

Table 4.1 summarizes the read-only information displayed in the **Signal** tab.

Table 4.1 Signal Tab Items

| Tab Title | Item | Parameters | Description |
|-----------|----------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Ports | RJ45 # Link Status | OK (Green) | The link for the specified port is valid and passes information |
| | | Suppressed Alarm (Green) | An alarm condition exists on the port but the corresponding alarm is disabled in the Alarm Enable tab |
| | | Link Failure (Red) | The link for the specified port is invalid (fails) and the corresponding alarm is enabled in the Alarm Enable tab |
| | Internal Link Status | OK (Green) | The GigE link to the OG3-FR midplane is valid and passes information |
| | | Suppressed Alarm (Green) | An alarm condition exists on the GigE link to the OG3-FR midplane but the corresponding alarm is disabled in the Alarm Enable tab |
| | | Link Failure (Red) | The GigE link to the OG3-FR midplane for is invalid and the corresponding alarm is enabled in the Alarm Enable tab |
| | RJ45 # Rate | # Mbps | Indicates the speed of the specified port |
| | | # Gbps | |
| | | N/A | The link has failed |
| | | No Link | The link is invalid |
| | Internal Rate | # Mbps | Indicates the duplex and speed of the GigE connection to the OG3-FR midplane |
| | | # Gbps | |
| | | N/A | The GigE link to the OG3-FR midplane has failed |
| | | No Link | The GigE link to the OG3-FR midplane is invalid |

Hardware Tab

Table 4.2 summarizes the read-only information displayed in the **Hardware** tab.

Table 4.2 Hardware Tab Items

| Tab Title | Item | Parameters | Description |
|-----------|--------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Hardware | HW Status | OK | Indicates the status of the hardware including the rear module. Some messages displayed are dependent on the settings in the Alarms Enable tab. |
| | | FPGA load invalid | |
| | | Incomp I/O Module | |
| | | Current out of spec | |
| | | Internal Error | |
| | Voltage (mV) | # | Measured input voltage |
| | Current (mA) | # | Measured current consumption of card |
| | CPU headroom | # | Processing power available |
| | RAM available | ### | On-board processing memory available |
| | Uptime (h) | # | Displays the number of hours since the last reboot of the card |
| | Configuration Bank | # | Storage count |

Product Tab

Table 4.3 summarizes the read-only information displayed in the **Product** tab.

Table 4.3 Product Tab Items

| Tab Title | Item | Parameters | Description |
|-----------|--------------|-----------------------------------|-------------------------------------------------------------------------------------------------------|
| Product | Product | CES-8940 | Displays the card name |
| | Supplier | Ross Video Ltd. | |
| | Board Rev | ## | Indicates the board issue |
| | Board S/N | ##### | Indicates the card serial number |
| | Rear Module | ## | Indicates the Rear Module installed |
| | | Rear Module Mismatch ^a | Indicates the rear module is an 8320AR-057 which is not the rear module that is supported by the card |
| | Software Rev | ##.## | Indicates the software version |

- a. Installing the card with the 8320AR-057 does not provide access to Ethernet Port 4. You must still configure these ports in the Setup tab of DashBoard, even though they are not accessible.

Port Stats Tab

Table 4.4 summarizes the read-only information displayed in the **Port Stats** tab.

Table 4.4 Port Stats Tab Items

| Menu Title | Item | Parameters | Description |
|-----------------------------------------|---------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RJ45 # Stats, Internal Stats | RX Packets | # | Reports the number of good packets received by the specified port This number also includes the number of packets received by the specified port that are greater than the standard maximum size and less than or equal to the jumbo packet size, regardless of CRC or alignment errors |
| | RX Errors | # | Reports the number of packets received by the specified port that have either an FCS error or an alignment error |
| | RX Dropped | # | Reports the number of good packets received by the specified port but were dropped due to a lack of resources or other reasons |
| | TX Packets | # | Reports the number of good packets transmitted by the specified port |
| | TX Dropped | # | Reports the total number of transmit packets that are dropped due to a lack of resources or other reasons |
| | TX Collisions | # | Reports the number of collisions experienced by the specified port during packet transmissions |
| Refresh Rate | Refresh Rate | # | Specifies how often the status fields in the Port Stats tabs are updated |
| | | Disabled* | Disables this feature |

Setup Tab

Table 4.5 summarizes the **Setup** options available in DashBoard.



Important — Contact your IT Department before connecting to your facility network to ensure that there are no conflicts or the possibility of creating a network loop.

Table 4.5 Setup Menu Items

| Menu Title | Item | Parameters | Description |
|--------------------------------------------|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------|
| | Enable Trunking | Selected | Enables the port trunking feature on the card |
| | | Cleared* | Disables this feature |
| Trunking - RJ45 # | Trunk 1 | Selected | Includes the specified ports into Trunk Group 1 |
| | | Cleared* | Excludes the port from Trunk Group 1 |
| | Trunk 2 | Selected | Includes the specified ports into Trunk Group 2 |
| | | Cleared* | Excludes the port from Trunk Group 2 |
| VLAN - RJ45 #, Internal^a | VLAN 1 | Selected* | Includes the specified port into Virtual LAN Group 1 |
| | | Cleared | Excludes the port from VLAN 1 |
| | VLAN 2 | Selected | Includes the specified port into Virtual LAN Group 2 |
| | | Cleared* | Excludes the port from VLAN 2 |
| | VLAN 3 | Selected | Includes the specified port into Virtual LAN Group 3 |
| | | Cleared* | Excludes the port from VLAN 3 |
| Port Enables | RJ45 # | Selected* | Enables the selected port |
| | | Cleared | Disables the port. This is useful when troubleshooting to turn ports off that are connected to devices without disconnecting cables |
| Factory Default | Reset | | Resets all configurable settings on the card to the factory default values |

- a. Note that a minimum of two ports must be assigned to a VLAN in order to establish communications.

Alarm Enable Tab

Table 4.6 summarizes the **Alarm** setup options available in DashBoard.

Table 4.6 Alarm Enable Menu Items

| Menu Title | Item | Parameters | Description |
|---------------|--------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switch | RJ45 # Link fails | Selected* | Enables the corresponding RJ45 Link Status field in the Signal tab to report when the specified ethernet port on the rear module loses network connection |
| | | Cleared | Disables this alarm for the specified port |
| | Internal Link Fails | Selected* | Enables the Internal Link Status field in the Signal tab to report when the GigE connection to the OG3-FR midplane experiences an error condition |
| | | Cleared | Disables this alarm |
| | Incompatible Rear Module | Selected* | The HW Status field in the Hardware tab reports when an unsupported rear module is installed with the card |
| | | Cleared | Disables this alarm |

Specifications

In This Chapter

This chapter includes the technical specifications for the CES-8940. Note that specifications are subject to change without notice.

The following topics are discussed:

- Technical Specifications

Technical Specifications

This section provides the technical specifications for the CES-8940.

Table 5.1 CES-8940 Technical Specifications

| Category | Parameter | Specification |
|---------------------------------|-------------------|----------------------------------|
| Ethernet 10/100/1000 | Number of Ports | 4 |
| | Cable Type | Standard straight-through CAT-5e |
| | Connector Type | RJ45 |
| Environment | Operating Range | 0°C to 40°C |
| Power | Power Consumption | 6W |

Service Information

In This Chapter

This chapter contains the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear product is not required. In the event of problems with your CES-8940, the following basic troubleshooting checklist may help identify the source of the problem. If the frame still does not appear to be working properly after checking all possible causes, please contact your openGear products distributor, or the Technical Support department at the numbers listed under the “**Contact Us**” section.

1. **Visual Review** — Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the card, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check** — Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Input Signal Status** — Verify that source equipment is operating correctly and that a valid signal is being supplied.
4. **Output Signal Path** — Verify that destination equipment is operating correctly and receiving a valid signal.
5. **Unit Exchange** — Exchanging a suspect unit with a unit that is known to be working correctly is an efficient method for localizing problems to individual units.

Bootload Button

In the unlikely event of a complete card failure, you may be instructed by a Ross Technical Support specialist to perform a complete software reload on the CES-8940.

To reload the software on a CES-8940

1. Eject the card from the frame.
2. Press and hold the **Bootload** button, while re-inserting the card into the frame.
3. Release the button.
 - The **PWR** LED flashes green while the card is waiting for a new software load.
 - If a new software load is not sent to the card within 60 seconds, the card will attempt to restart with its last operational software load.
 - Software loads can be sent to the CES-8940 via the ethernet connection on the rear of the frame.

Warranty and Repair Policy

The CES-8940 is warranted to be free of any defect with respect to performance, quality, reliability, and workmanship for a period of FIVE (5) years from the date of shipment from our factory. In the event that your CES-8940 proves to be defective in any way during this warranty period, Ross Video Limited reserves the right to repair or replace this piece of equipment with a unit of equal or superior performance characteristics.

Should you find that the CES-8940 has failed after your warranty period has expired, we will repair your defective product should suitable replacement components be available. You, the owner, will bear any labor and/or part costs incurred in the repair or refurbishment of said equipment beyond the FIVE (5) year warranty period.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profits) incurred by the use of this product. Implied warranties are expressly limited to the duration of this warranty.

This CES-8940 User Manual provides all pertinent information for the safe installation and operation of your openGear Product. Ross Video policy dictates that all repairs to the CES-8940 are to be conducted only by an authorized Ross Video Limited factory representative. Therefore, any unauthorized attempt to repair this product, by anyone other than an authorized Ross Video Limited factory representative, will automatically void the warranty. Please contact Ross Video Technical Support for more information.

In Case of Problems

Should any problem arise with your CES-8940, please contact the Ross Video Technical Support Department. (Contact information is supplied at the end of this publication.)

A Return Material Authorization number (RMA) will be issued to you, as well as specific shipping instructions, should you wish our factory to repair your CES-8940. If required, a temporary replacement frame will be made available at a nominal charge. Any shipping costs incurred will be the responsibility of you, the customer. All products shipped to you from Ross Video Limited will be shipped collect.

The Ross Video Technical Support Department will continue to provide advice on any product manufactured by Ross Video Limited, beyond the warranty period without charge, for the life of the equipment.

Contact Us

Contact our friendly and professional support representatives for the following:

- Name and address of your local dealer
- Product information and pricing
- Technical support
- Upcoming trade show information

Technical Support

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